

AMMONIA CONTROL

WHAT IS IT? It is a naturally occurring volcanic rock that contains the zeolite mineral called “clinoptilolite”. The rock is drilled, blasted, crushed and screened to a granular size (14 x 40 mesh) that is not dusty and flows well. One of the best zeolites in the world because it contains more than 90% clinoptilolite and therefore it holds a high amount of ammonia, it contains very little sodium, which is toxic to plants, and it contains no crystalline silica and is not a cause for silicosis. This zeolite is a natural cation exchange agent that is inexpensive.

HOW IT WORKS. It has two ways of holding cations (positive ions such as ammonium, calcium, sodium, and potassium). The first way is in its crystal lattice where the ammonium (the product of ammonia and water) is exchanged instantly. The second way is in its channel-ways where it can hold up to 55% of its weight in water and ammonium. The zeolite is an excellent desiccant. In this case the cations are more loosely held and are water-soluble. Four hundred and fifty tons were used to clean up the largest spill of anhydrous ammonia gas in the history of the United States (Canadian Pacific Railroad, Minot, North Dakota, January 18, 2002, where 200,000 gallons of ammonia were released, 13 people were hospitalized and one was killed).

PROBLEMS WITH AMMONIA GAS:

1. The first problem with ammonia is that it is a health hazard than can be lethal to humans. In low levels it severely affects a man’s ability to work. In higher levels it can cause lasting respiratory and other medical problems.
2. Ammonia quickly becomes ammonium in water and this oxidizes to nitrites and nitrates that contaminates the water table and make water undrinkable. It is one of the most major environmental problems in the world.
3. **CONTROL OF NITROUS OXIDE.** The surface of the zeolite can be modified to a positive charge so that it will adsorb NO₃ and NO₂ gas. This is referred to as an “SMZ” (surface modified zeolite). Testing will be necessary to determine the best application method, but top dressing the blast area should be adequate to mitigate nitrous oxide.